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SCHLUMBERGER K.K.			GAY, JENNIFER HAWKINS	
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SAGAMIHARA-SHI, KANAOAWA-KEN, 229-0006			PAPER NUMBER	
JAPAN			3672	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/675,053

Applicant(s)

MIYAMOTO ET AL.

Examiner

Jennifer H. Gay

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 48-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-47 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date 8/10/04, 2/18/05.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Claims 48-51 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in the reply filed on November 14 2005.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 66 and 68. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because the abstract contains the purported merit "are particularly well suited". Correction is required. See MPEP § 608.01(b).

4. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure

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of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

5. The disclosure is objected to because of the following informalities: in line 2 of paragraph [0017] on page 6, "FIG. 2B" should be changed to --FIG. 2A--.

Appropriate correction is required.

6. The use of the trademark RADEL®-R has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Objections

7. Claims 2, 5, 10, 15, 35, and 45 are objected to because of the following informalities:

- Claim 2 is objected to because of the use of the vague phrase "may be". The use of such phrases makes it unclear if applicant is positively claiming the limitations that follow.

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- Claims 5 and 35 are objected to due to the use of a trademark in a claim. The use of trademarks in claims is not permitted as the product for which the trademark is used may change or be adapted over the life of the patent thus the scope of the claim is not definite currently or in the future.
- Claim 10 is objected to because there is insufficient antecedent basis for “the fluid”. It is assumed that claim 10 was intended to depend from claim 4.
- Claims 15 and 45 are objected to it is unclear as to what the phrases “a d31 effect” and “D33 effect” are referring. Merely providing a definition for these phrases will be sufficient to overcome this objection.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 7, 15, 17, 22, 27, 28, 36, 37, 43, 45, and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Aron et al. (US 5,753,812).

Regarding claim 1: Aron et al. discloses an apparatus for generating acoustic waves in a formation traversed by a wellbore. The apparatus includes a multi-pole transmitter **19** that includes four transmitters housed in a drill collar **13**. The four transmitters are spaced circumferencely around the collar.

Regarding claims 2, 37: The four transmitters comprise a monopole source that when combine comprises a monopole, dipole, or quadrupole transmitter.

Regarding claim 3: The each of the transmitters is a transducer **20** located within a canister **21**.

Regarding claim 7: The transducers are PZT piezo-ceramic transducers.

Regarding claim 15: The diameter of the transducers expands or contracts via a d31 effect when voltage is applied.

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Regarding claim 17: The transmitters are located in respective recesses in the drill collar (Figure 2) and are covered by a shield 26 that includes a hole.

Regarding claim 22: Aron et al. discloses an apparatus for generating acoustic waves in a formation traversed by a wellbore. The apparatus includes the following features:

- A plurality of cylindrical piezo ceramic elements 20 spaced around a common circumference to form a multi-pole acoustic transmitter. The elements are uniformly polarized in a radial direction.
- A plurality of polymer canisters 21. Each canister is associated with and houses one of the elements.

Regarding claim 27: None of the elements are pres-stressed.

Regarding claim 18: None of the elements are wound under tension with high strength fibers.

Regarding claim 36: The four elements are spaced circumferentially around a drill collar 13 within respective recesses (Figure 2).

Regarding claims 43, 46: Aron et al. disclose the method for using the above apparatus to log a wellbore.

Regarding claim 45: The method uses waves generated by a d31 effect and not a D33 effect.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 4, 6, 10, 16, and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aron et al. in view of Birchak et al. (US 6,354,146).

Regarding claims 4, 29: Aron et al. discloses all of the limitations of the above claims except for the canisters being filled with fluid.

Birchak et al. discloses a canister and transducer similar to that of Aron et al. Birchak et al. further teaches filling the canister with fluid (6:37-51).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the apparatus of Aron et al. such that the canister was filled with fluid as taught by Birchak et al. in order to have enhanced the acoustical properties of the transducer.

Regarding claim 6: Neither Aron et al. nor Birchak et al. disclose the canister having a thickness of approximately 1mm. However, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the canister of Aron et al. with a thickness of approximately 1 mm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 10: A voltage is applied to the transducers at the resonate frequency of the fluid in the canisters.

Regarding claim 16: Aron et al. discloses all of the limitations of the above claims except for the apparatus including a bellows-type pressure compensator.

The canister and transducer of Birchak et al. further includes a bellows-type pressure compensator **124**.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the apparatus of Aron et al. to include the bellows-type compensator of Birchak et al. in order to have prevented damage to the canister and transducer caused by the pressure waves produced by the transducer.

Regarding claim 30: The transducers of Aron et al. include a first and second end that are spaced from the canister.

Regarding claims 31, 32: The input signal supplied to the transducer of Aron et al. is of a frequency that is at or below than the resonant frequency of the transducers.

Regarding claim 33: The resonant frequency of the fluid in the canisters is held below that of the transducers by the geometry of the transducers.

12. Claims 5 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aron et al. in view of Havira (US 4,255,798).

Aron et al. discloses all of the limitations of the above claims except for the canister being made of RADEL®-R.

Havira discloses an acoustic well logging tool. Havira further teaches forming a portion of the housing from RADEL®-R (30:35-40).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the canister of Aron et al. to be formed from RADEL®-R as taught by Havira in order to have used a material that allowed acoustic waves to pass therethrough but with little reflection of the material itself (30:40-43).

13. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aron et al.

Regarding claim 18: Aron et al. discloses all of the limitations of the above claims except for the shield including a plurality of holes. However, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the shield of Aron et al. with a plurality of holes instead of one, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. In this instance, additional holes would have provided a means for still allowing pressure waves to adequately travel therethrough while increasing the stability of the shield.

Regarding claim 19: Aron et al. discloses all of the limitations of the above claims except for the specifically recited dimensions of the recesses. However, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the recesses of Aron et al. with the claimed dimensions, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 20: Aron et al. discloses all of the limitations of the above claims except for the cylindrical transducers having a length between 5 and 10 cm and a wall thickness between 3 to 6 mm. However, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cylindrical transducers of Aron et al. with a length between 5 and 10 cm and a wall thickness between 3 to 6 mm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 21: Aron et al. discloses all of the limitations of the above claims except for the drill collar having a pipe with an outer diameter around 17.5 cm and an inner diameter around 6.1 cm. However, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, for the drill collar and drill pipe of Aron et al. to have had an outer diameter around 17.5 cm and an inner diameter around 6.1 cm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

14. Claims 14, 23-26, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aron et al. in view of Yogeswaren (US 2005/0000279; referred to hereafter as Yoge).

Regarding claims 14, 23, 47: Aron et al. discloses all of the limitations of the above claims except for the transducers having an internal and external surface that are each covered with a conductive layer that includes electrodes.

Yoge disclose an apparatus similar to that of Aron et al. Yoge further teaches a cylindrical transducer where the internal and external surfaces are covered with gold (paragraph [0041]). The conductive layer also includes electrodes (see claim 33).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the transducers of Aron et al. so that the internal and external surface were each covered with a conductive layer that includes electrodes as taught by Yoge in order to have provided a means for effectively coupling the transducer to electronics such as control equipment.

Regarding claim 24: The electrodes uniformly polarize the transducer radially.

Regarding claims 25, 26: Neither Aron et al. nor Yoge disclose that the conductive layer is silver or nickel, however, it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have used silver or nickel to form the conductive layer of Aron et al. in view of Yoge, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

15. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aron et al. in view of Shirley et al (US 4,525,645).

Regarding claim 8: Aron et al. discloses all of the limitations of the above claims except for the transducers being a tube resonator.

Shirley et al. discloses a transducer that can be used in a wellbore drilling operation (7:39-43). Shirley et al. further teaches the use of hollow, cylindrical transducers which the examiner equates to a tube resonator.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the transducers of Aron et al. so that they were tube resonators as taught by Shirley et al. in order to have used a shape that is well known to provide more resonance thus more acoustical output than a solid object thus increasing the output of the transducers without requiring more energy use.

Regarding claim 9: A voltage is applied to the transducers at a frequency that was lower than the resonant frequency of the transducers.

16. Claims 38 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birchak et al. in view of Shirley et al.

Regarding claim 38: Birchak et al. discloses an acoustic transmitter apparatus that includes the following features:

- A tubing collar coupled to a tubing string **11**. The collar includes a recess (Figure 2).

- A cylindrical piezo ceramic element **102** enclosed in a canister **120** within the recess.
- A fluid within the canister (6:37-51).

Birchak et al. discloses all of the limitations of the above claims except for the transducers being a tube resonator.

Shirley et al. discloses a transducer that can be used in a wellbore drilling operation (7:39-43). Shirley et al. further teaches the use of hollow, cylindrical transducers which the examiner equates to a tube resonator.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the transducers of Birchak et al. so that they were tube resonators as taught by Shirley et al. in order to have used a shape that is well known to provide more resonance thus more acoustical output than a solid object thus increasing the output of the transducers without requiring more energy use.

Regarding claim 41: The element is uniformly polarized in a radial direction.

17. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birchak et al. in view of Shirley et al. as applied to claim 38 above, and further in view of Aron et al.

Regarding claim 39: Birchak et al. and Shirley et al. disclose all of the limitations of the above claims except for the apparatus including four recesses and a transducer placed in each.

Aron et al. discloses an apparatus similar to that of Birchak et al. Aron et al. further teaches the use of four transducers each located within a recess in the tubing collar.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the apparatus of Birchak et al. to include four transducers that are each located in a recess as taught by Aron et al. in order to have a means for increasing the acoustical output of the apparatus without having to provide more power to individual transducers.

Regarding claim 40: The four transducers comprise a monopole source that when combine comprises a monopole, dipole, or quadrupole transmitter.

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18. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Birchak et al. in view of Shirley et al. as applied to claim 38 above, and further in view of Havira.

Birchak et al. and Shirley et al. disclose all of the limitations of the above claims except for the canister being made of RADEL®-R.

Havira discloses an acoustic well logging tool. Havira further teaches forming a portion of the housing from RADEL®-R (30:35-40).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the canister of Birchak et al. in view of Shirley et al. to be formed from RADEL®-R as taught by Havira in order to have used a material that allowed acoustic waves to pass therethrough but with little reflection of the material itself (30:40-43).

Allowable Subject Matter

19. Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

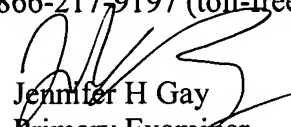
Conclusion

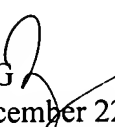
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer H. Gay whose telephone number is (571) 272-7029. The examiner can normally be reached on Monday-Thursday, 6:30-4:00 and Friday, 6:30-1:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on (571) 272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer H Gay
Primary Examiner
Art Unit 3672

JHG 
December 22, 2005